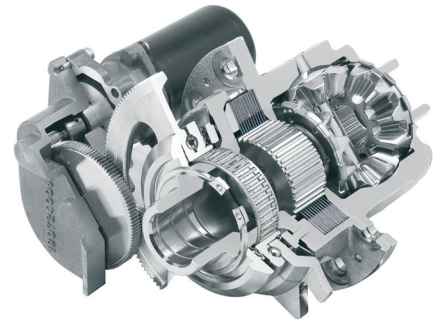




Electronic Torque Manager (ETM[®])

GKN Driveline's innovative Electronic Controlled Torque Manager (ETM[®]) is an actively controlled coupling in on-demand and full-time all-wheel-drive drivelines as well as in axle applications. ETM's direct actuation method provides a most responsive and controllable electronically controlled driveline and axle coupling.



Benefits

- > Smooth and immediate engagement (mechanically pre-emptive)
- > Superior low drag torque performance (optimum fuel economy)
- > Excellent release response time and high control accuracy
- > Two wheel-tow capable
- > In production since 2003

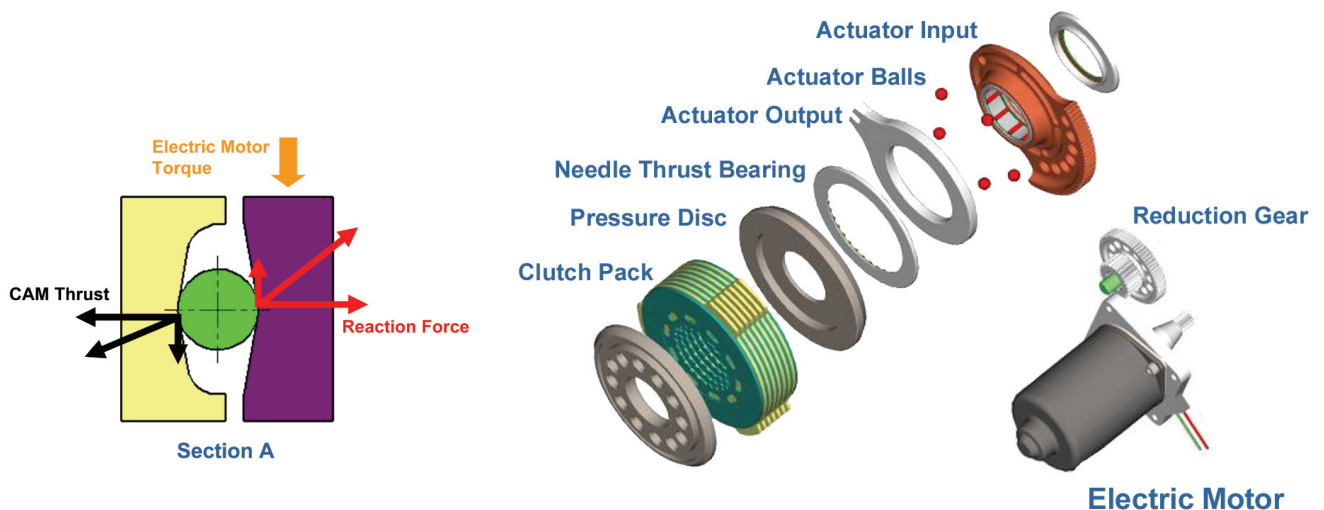
Operating Principle

- > Current supplied to an electric-motor connected to a reduction gear directly rotates the cam gear of a unidirectional ball-ramp mechanism
- > This rotational torque causes the balls to roll up the opposing ramps which pushes the front cam forward
- > The cam thrust is transmitted through the pressure disc compressing the clutch

- > The rotational torque from the outer plates (input) is then transferred to the inner plates (output) proportional to the electrical current
- > An Electronic Control Unit (ECU) controls the clutch torque by adjusting the amount of current based on available vehicle inputs and control algorithm

Technical Features

- > Optimum release response is achieved by back driving the electric-motor
- > The low drag torque performance is achieved at all speed difference since actuation is independent of the speed difference
- > Torque transfer is mechanically pre-emptive and does not require any speed difference to activate
- > Full and continuous lock-up feature is available (0.5 A current)



For further information please contact:

GKN Driveline Headquarters
 PO Box 4128, Redditch, Worcestershire, B98 0AW, United Kingdom
 Tel: +44 (0)1527 533660, Fax: +44 (0)1527 533615
 Email: info@gkndriveline.com, www.gkndriveline.com